RESULTS OF SOUTH DAKOTA BLACK-TAILED PRAIRIE DOG ACREAGE SURVEY, 2002-2003

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INTRODUCTION

In its 12-Month Finding for a Petition to List the Black-tailed Prairie Dog as Threatened, the U.S. Fish and Wildlife Service (USFWS) reported historical estimates for South Dakota as ranging from 33,000 acres to 1,757,000 acres (USFWS 2000). No statewide prairie dog acreage survey had been conducted in South Dakota prior to a recent transect survey coordinated by SDGFP, conducted by the USDA Forest Service, and completed in 2004.

The South Dakota Department of Game, Fish and Parks (SDGFP) is a member of the Interstate Prairie Dog Team, a state-led group formed to address the biological needs of the black-tailed prairie dog such that federal listing under the Endangered Species Act is unnecessary. An important accomplishment of the Team was the formulation of acreage goals by state and across the range of the species. Methodology for setting these goals is described in Luce 2003. The Team recommended a range-wide goal of 1.7 million acres to be apportioned among the states of Arizona, Colorado, Kansas, Montana, North Dakota, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. South Dakota's acreage goal is 199,472.

To accommodate the separate jurisdictions and prairie dog planning efforts by Native American tribes in South Dakota, the acreage goal needed to be apportioned between tribal and non-tribal lands. Based on an estimate that approximately 5 million acres of tribal trust lands occur within the black-tailed prairie dog range in South Dakota (30,037,400 acres), approximately 16.3% of the acreage goal was assigned as "tribal" prairie dog acreage, resulting in an acreage goal on non-tribal lands (federal, state, and private lands combined) of 166,958 acres. This process was conducted at the request of South Dakota tribes that expressed an opinion on this topic. Source of acreage figures used to determine tribal acreage goal: U.S. Department of the Interior, Bureau of Indian Affairs web-site, www.doi/gov/bia/realty/report97.html NOTE: This website is presently disabled.

SDGFP contracted with the U.S. Forest Service to conduct an aerial survey of South Dakota's primary black-tailed prairie dog range. The surveyed area included all counties west of the Missouri River and counties east of and adjacent to the Missouri River, with the exception of extreme southeastern South Dakota. Small, scattered prairie dog colonies occur in additional counties, but this distribution did not justify a thorough aerial survey.

The survey was conducted to:

1. Determine the usefulness of the aerial transect method for estimating black-tailed prairie dog acreage in South Dakota;
2. Determine baseline black-tailed prairie dog acreage data for South Dakota by land ownership; and
3. Determine whether South Dakota had met its acreage goal under the formula developed by the Interstate Prairie Dog Team (Luce 2003).

PROJECT ADMINISTRATION AND ACKNOWLEDGEMENTS

SDGFP received funding from the USFWS to assist with the development of a black-tailed prairie dog Candidate Conservation Agreement with Assurances for the State of South Dakota. This funding was matched with SDGFP license dollars. Once federal funding was exhausted, remaining funding was provided by SDGFP license dollars.

The project was conducted under a Participating Agreement between the USDA Forest Service and SDGFP (FS Agreement No. 02-PA-11020700-015).

Charlie Olson, SDGFP GIS Specialist, assisted with data analysis and map production.

Data were shared with land management agencies and organizations upon request. A copy of data corresponding to recognized reservation boundaries was given to the Bureau of Indian Affairs, with a request that BIA distribute the data to Native American tribes. Figure 2 of this report is included on the SDGFP website.

SURVEY METHODS

The survey was conducted in two phases during 2002-2003.

Phase I was carried out during May-October, 2002. Phase I consisted of flying a Cessna 172 along flight lines over each county at two-mile intervals and looking for prairie dog colonies within one mile on either side of the aircraft. Flight lines were created in Garmin MapSource® and totaled 24,000 miles. The flight lines and locations of known colonies on public lands and elsewhere were displayed on the GPS receiver's moving map. When observed, the known colonies were ignored because their size was already known by public and other entities. Flight lines were oriented north-south and the aircraft was flown about 1000 feet above ground level at a speed of 100 mph. Upon sighting a colony, the aircraft was positioned over the colony whose location was recorded with a Garmin WAAS-enabled GPSMAP 196 or GPSMAP 296 receiver (lat/long; NAD83). The aircraft then returned to the flight line and the search for colonies continued. In some counties, there were hundreds of colonies, necessitating frequent departures from the flight lines. In other counties, colonies were few and departures from flight lines were infrequent. Colony boundaries were generally determined by the location of the colony's outermost burrows.

Phase II was carried out during June-October, 2003 and consisted of returning to each colony using the route function in Garmin MapSource®, and taking a picture with a Canon 10d digital camera or a Kodak 14n digital camera and 24mm lens. Those pictures captured with the Kodak 14n camera also incorporated GPS location data. The aircraft was flown between 3,000 and 4,000 feet above ground level. The camera was mounted over a fuselage port and tethered by firewire to a computer that saved the pictures. Depending upon colony size, one or more pictures were taken to cover the extent of the colony. For areas containing large concentrations of colonies such as western Shannon County, northern Todd County, and parts of Dewey, Mellette, and

Ziebach counties, north/south flight lines were flown to acquire overlapping digital pictures of the entire area. Nearly 20,000 images were taken during Phase II.

DeLorme XMap®/GIS Editor was used to reference digital pictures to Digital Orthophoto Quads. To determine the size of the colony, a polygon was then drawn around the outside boundary of the colony, usually indicated by the outermost burrows. Separate county files containing all the measured colonies in a given county were exported as .dxf files and sent to South Dakota Game, Fish and Parks for display and tallying in ESRI ArcGIS™.

SURVEY ERROR

The purpose of this aerial survey was to be as thorough as possible in detecting the prairie dog colonies in South Dakota and to develop a better estimate of prairie dog colony acreage than obtained from previous aerial-line intercept methods (Sidle et al. 2001). Colonies are usually very visible from an aircraft and can even be seen on satellite images (Sidle 1999, Sidle et al. 2001, 2002). Colony mounds and prairie dog herbivory that imparts a different color to the ground than adjacent rangeland usually allows easy detection of colonies. Moreover, colony size ranges from less than one acre to several thousand acres increasing their visibility. However, no matter how thorough the aerial survey, the survey likely missed some colonies.

The confidence associated with the estimate of prairie dog colonies in South Dakota can be estimated through Program Distance or a secondary data set. Program Distance develops a sighting function and a confidence interval based upon colony location, geometric mean of the colony, and the distance from the flight line. However, an alternative or “low tech” estimate of error can be derived from a secondary data set of overlapping digital pictures taken in areas of high colony density in several counties as noted above. A frame-by-frame examination of these pictures yields a complete census of prairie dog colonies of those areas and serves as a basis to determine the accuracy of Phase I in detecting prairie dog colonies and the resulting changes in area estimates.

Areas such as northern Todd County with large areas of tribal lands contain large numbers of colonies. During Phase I in northern Todd County, for example, the aircraft was constantly maneuvered to record the location of colonies. Flight line departures occurred at least every 0.5 miles. In such areas, the chance of missing colonies increased as the workload increased. During Phase I in 2002, 513 colonies in northern Todd County were detected and were imaged and measured in 2003 for a total of 38,431 acres. In 2003, another 26 colonies (426 acres) were detected on overlapping digital pictures taken. The 4.8% undercount of colonies in northern Todd County had an associated undercount of area equal to 1.1%. Similar comparisons in high-density colony areas in Mellette, Shannon, Dewey, and Ziebach counties indicated similar undercounts of numbers of colonies for a combined undercount colony area of 1.4%. Applying the 1.4% undercount area value to the 412,122 acres of prairie dog colonies in the state indicates an overall undercount of 5,769 acres.

RESULTS

A total of 412,122 acres of prairie dogs were documented during the aerial transect survey, divided as follows: 216,749 acres on tribal lands and 195,373 acres on non-tribal lands (Table 1). Figure 1 presents a state map with county boundaries indicated. Tables 2-4 indicate how the total acreage figure is distributed by government agency. Figure 2 presents a graphic illustration of prairie dog colony distribution overlaid on land ownership layers.

The aerial transect survey fulfilled the objective of determining the baseline acreage for the primary range of the black-tailed prairie dog in South Dakota. The survey also accomplished the objective of determining whether South Dakota had met its acreage goal as recommended by the Interstate Prairie Dog Team. Because of the cost and time involved in completing this survey, it is unlikely that this level of effort will be repeated every three years, the interval recommended by the Interstate Prairie Dog Team to reestimate prairie dog acreage in the U.S. However, a sub-sampling effort with this technique is a possibility. SDGFP will continue to work with the Interstate Prairie Dog Team in its effort to determine a practical and biologically-defensible range-wide monitoring system for the black-tailed prairie dog.

Table 1. Prairie dog acreage distribution

County	Total Acres	State Acres	Federal Acres	Tribal Acres	Private Acres	Non-tribal Acres
Bennett	6,511	77	343	1,880	4,212	4,631
Brule	1,277	3	18	0	1,256	1,277
Buffalo	1,983	0	0	734	1,249	1,249
Butte	2,009	163	453	0	1,393	2,009
Charles Mix	245	15	20	15	196	231
Corson	26,213	225	1,427	14,989	9,572	11,224
Custer	13,213	126	3,357	0	9,729	13,213
Dewey	48,342	141	0	33,207	14,993	15,134
Fall River	9,291	152	2,037	0	7,102	9,291
Gregory	1,131	12	0	28	1,091	1,103
Haakon	1,483	0	2	0	1,481	1,483
Hand	252	0	0	0	252	252
Harding	2,976	760	96	0	2,120	2,976
Hughes	1,449	0	52	228	1,168	1,220
Hyde	729	0	0	181	548	548
Jackson	11,586	23	564	4,681	6,318	6,905
Jones	2,536	36	161	0	2,339	2,536
Lyman	5,781	101	354	2,167	3,159	3,614
Meade	18,116	358	387	0	17,371	18,116
Mellette	37,960	190	0	21,936	15,833	16,024
Pennington	36,804	788	20,650	0	15,367	36,804
Perkins	8,093	439	929	0	6,725	8,093
Potter	162	0	0	0	162	162
Shannon	90,736	0	679	84,069	5,988	6,667
Stanley	5,813	99	654	704	4,356	5,110
Sully	815	0	1	0	815	815
Todd	49,884	0	0	38,865	11,019	11,019
Tripp	3,360	0	0	290	3,070	3,070
Walworth	538	0	60	0	478	538
Ziebach	22,834	259	0	12,775	9,800	10,059
Totals	412,122	3,967	32,244	216,749	159,162	195,373

Definitions:
total acres: total number of prairie dog acres
state acres: prairie dog acreage on state agency lands
federal acres: prairie dog acreage on federal agency lands
tribal acres: prairie dog acreage on tribal trust lands
nontribal acres: sum of prairie dog acreage on private, state, and federal lands

Table 2. Prairie dog acreage distribution by government agency

Agency	Acres
SD School and Public Lands	3,655
SDGFP – Wildlife Division	126
SDGFP – Parks Division	185
U.S. Army Corps of Engineers	1,214
Bureau of Land Management	1,082
Bureau of Reclamation	12
Fort Pierre National Grassland	763
Grand River National Grassland	1,627
Wall Ranger District	19,011
Fall River District	1,934
National Grassland Total	23,335
Badlands Bombing Range	679
National Forest Lands	56
Wind Cave National Park	1,463
Badlands National Park	4,001
National Park Service	5,464
Lacreek NWR	343
Tribal Lands	216,749
Non Tribal Lands	195,373
TOTAL ACRES*	412,122

*totals vary slightly due to rounding

Table 3. Prairie dog acreage distribution by state agency

COUNTY	SD SCHOOL AND PUBLIC LANDS	SDGFP – WILDLIFE DIVISION	SDGFP – PARKS DIVISION	TOTAL STATE AGENCY ACRES
Bennett	14	62	0	77
Brule	0	3	0	3
Buffalo	0	0	0	0
Butte	163	0	0	163
Charles Mix	0	15	0	15
Corson	219	5	0	225
Custer	22	0	104	126
Dewey	141	0	0	141
Fall River	102	2	48	152
Gregory	0	0	12	12
Haakon	0	0	0	0
Hand	0	0	0	0
Harding	760	0	0	760
Hughes	0	0	0	0
Hyde	0	0	0	0
Jackson	23	0	0	23
Jones	36	0	0	36
Lyman	76	15	9	101
Meade	346	0	12	358
Mellette	190	0	0	190
Pennington	788	0	0	788
Perkins	416	23	0	439
Potter	0	0	0	0
Shannon	0	0	0	0
Stanley	99	0	0	99
Sully	0	0	0	0
Todd	0	0	0	0
Tripp	0	0	0	0
Ziebach	259	0	0	259
TOTAL*	3,654	126	185	3,965

*totals may vary slightly due to rounding

Table 4. Prairie dog acreage distribution by federal agency

COUNTY	USFWS REFUGES	NAT FOREST	NAT GRASS-LAND	BOR	BLM	NAT PARKS	COE	BBR	TOTAL FED. AGENCY ACRES
Bennett	343								343
Brule							18		18
Buffalo									0
Butte					453				453
Charles Mix							20		20
Corson			698				730		1427
Custer		45	1829		21	1463			3357
Dewey									0
Fall River			1934		103				2037
Gregory									0
Haakon					2				2
Hand									0
Harding		11			85				96
Hughes				12			41		52
Hyde									0
Jackson			564						564
Jones			161						161
Lyman			89				265		354
Meade					387				387
Mellette									0
Pennington			16618		31	4001			20650
Perkins			929						929
Shannon								679	679
Stanley			513		1		140		654
Sully							1		1
Todd									0
Tripp									0
Walworth							60		60
Ziebach									0
TOTAL*	343	56	23,335	12	1,082	5,464	1,214	679	32,245

BOR = Bureau of Reclamation
BLM = Bureau of Land Management
COE = U.S. Army Corps of Engineers
BBR = Badlands Bombing Range (U.S. Dept. of Defense)

*totals may vary slightly due to rounding

Figure 1. South Dakota county map

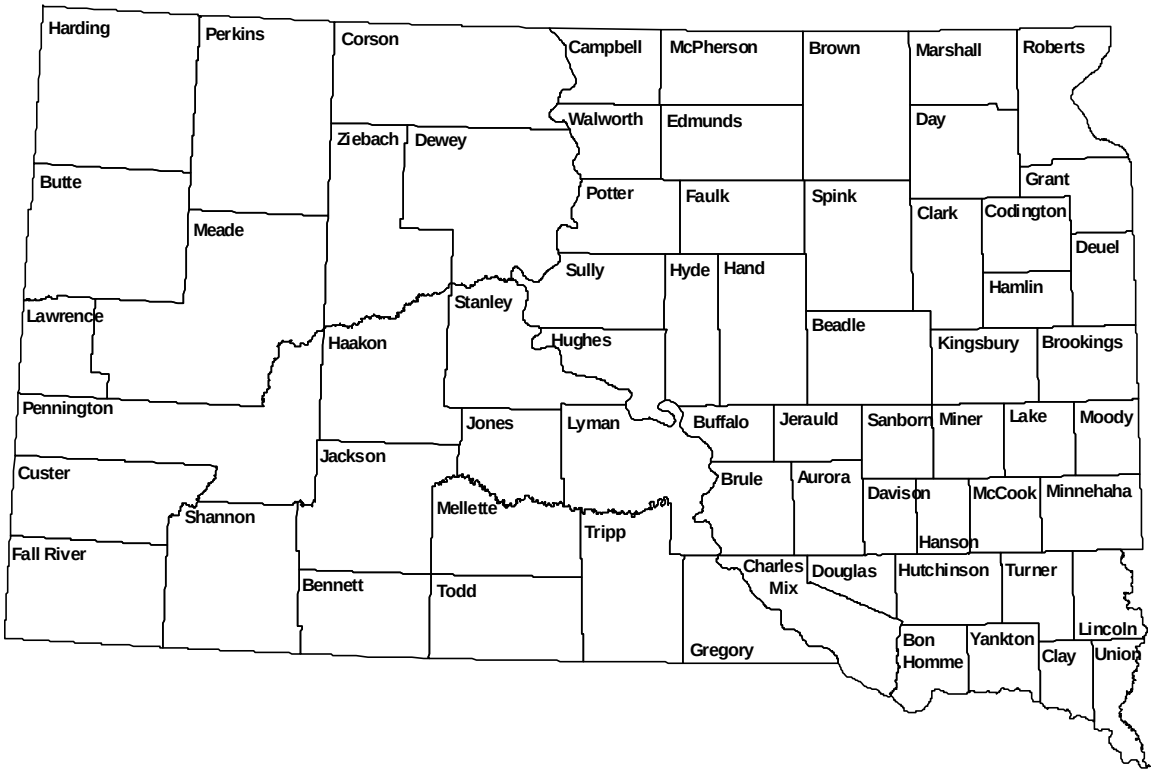
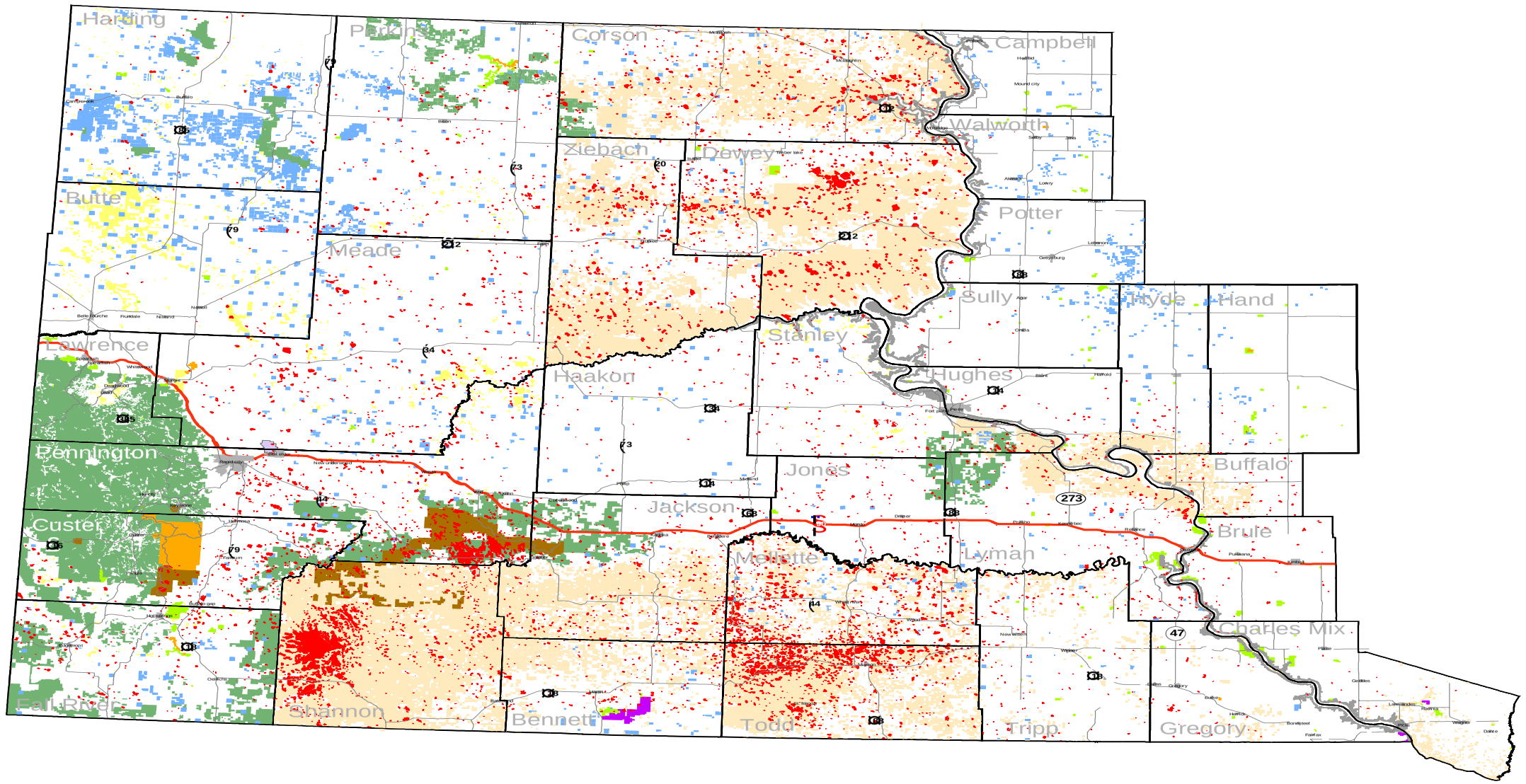


Figure 2. Prairie dog acreage distribution map



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